

Association between Maternal Knowledge of Complementary Feeding and Complementary Feeding Practices among Infants Aged 6–12 Months at Mujur Community Health Centre, East Praya, Central Lombok, in 2025

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Abstract:

Complementary foods are introduced at six months of age to meet nutritional requirements that breast milk alone can no longer fully satisfy. Their introduction should be gradual, with food texture, quantity and variety adapted to the infant's developmental stage. This study aimed to examine the association between maternal knowledge of complementary feeding and complementary feeding practices among infants aged 6–12 months at Mujur Community Health Centre, East Praya, Central Lombok, in 2025. A preliminary survey involving interviews with 12 mothers indicated that seven had introduced complementary foods before their infants reached six months of age, whilst five had provided formula milk from birth owing to perceived insufficient breast milk production. Bivariate analysis was conducted using the chi-square test at a 95% confidence level. The findings revealed a statistically significant association between maternal knowledge of complementary feeding and complementary feeding practices among infants aged 6–12 months ($p = 0.001$). These findings support the importance of strengthening maternal education on the timing of complementary food introduction, appropriate food texture and quantity, and dietary diversity alongside continued breastfeeding. Such education may support feeding practices that are appropriate to infants' nutritional needs and developmental stages

Keywords: maternal knowledge; complementary feeding; infant feeding practices; infants aged 6–12 months

INTRODUCTION

Adequate nutrition during infancy is essential for supporting children's growth and development. A particularly important stage is the transition from exclusive breastfeeding to complementary feeding, during which infants begin to receive additional foods to meet nutritional requirements that breast milk alone can no longer fully satisfy. The World Health Organization (WHO, 2023) explains that complementary feeding generally begins at six months of age and continues until 23 months. This period is also characterised by an increased vulnerability to nutritional deficiencies and growth faltering, highlighting the importance of appropriate feeding practices. WHO guideline on complementary feeding.

Complementary foods supplement infants' nutritional intake as their

energy and nutrient requirements increase. Their provision should be timely, nutritionally adequate, safe, and appropriate to the infant's developmental abilities and feeding cues. Successful complementary feeding therefore involves more than the availability of food; it also requires that the food provided meets the infant's needs. The hygiene of ingredients and utensils, together with appropriate preparation and storage, forms an integral part of safe complementary feeding practices. WHO, Complementary feeding.

Child undernutrition remains an important public health concern in Indonesia. The 2018 Basic Health Research survey (Riskesdas) reported that the combined prevalence of underweight and severe underweight among children under five was 17.7%, whilst the prevalence of stunting, including severe stunting, was 30.8%. These findings illustrate the continuing need to address inadequate nutrition and impaired growth. Nevertheless, these national figures describe conditions in 2018 and should not be interpreted as estimates of the nutritional situation among children attending Mijur Community Health Centre in 2025. Ministry of Health of the Republic of Indonesia, Overview of the 2018 Riskesdas findings.

Infants aged 6–12 months constitute a particularly relevant group for examining complementary feeding, as this age range encompasses the initial introduction of foods and subsequent adjustments in food texture and meal frequency. WHO recommends introducing complementary foods at six months, with two to three meals daily at 6–8 months, increasing to three to four meals daily at 9–11 months. Food consistency and variety should be increased gradually in accordance with the infant's abilities. By approximately 12 months, most children can consume the same types of food as the rest of the family, provided that their preparation and presentation are appropriate and safe. WHO, Complementary feeding.

Maternal knowledge is an important consideration when examining complementary feeding practices. This encompasses an understanding of the appropriate age for introducing foods, ingredient selection, food texture, portion size, meal frequency, and hygienic preparation and handling. WHO emphasises that appropriate complementary feeding requires accurate information alongside support from families, communities, and health services. Maternal knowledge should therefore be considered within the wider context in which everyday feeding decisions are made and implemented. WHO, Complementary feeding.

In the present study, maternal knowledge is considered a factor potentially associated with complementary feeding practices. Conceptually, an understanding of infants' nutritional requirements and developmental readiness may inform mothers' decisions about when and how to introduce complementary foods. However, adequate knowledge cannot be assumed to translate consistently into appropriate practice. Food availability, family support, time for meal preparation, and access to professional guidance are contextual factors that warrant consideration when interpreting this association. The relationship between maternal knowledge and complementary feeding practices therefore requires empirical investigation.

A preliminary survey conducted at Mujur Community Health Centre, East Praya, Central Lombok, involved interviews with 12 mothers of infants aged 6–12 months. Seven mothers reported introducing complementary foods before their infants reached six months of age. Five mothers also reported providing formula milk from birth because they perceived their breast milk supply to be insufficient. The reported introduction of complementary foods before six months indicates a discrepancy between the practices of some mothers interviewed and the recommended timing of complementary food introduction.

The provision of formula milk from birth should be distinguished from the early introduction of complementary foods. In this study, formula feeding provides contextual information about milk-feeding practices and mothers' perceptions of breast milk sufficiency; it should not automatically be classified as early complementary feeding. Likewise, mothers' reports of a limited milk supply reflect their perceptions and do not constitute a clinical assessment of milk production or the adequacy of milk intake. Maintaining these distinctions is necessary to ensure that the research problem and the measurement of complementary feeding practices remain consistent with the study's operational definitions.

The preliminary findings cannot be generalised to all mothers of infants aged 6–12 months attending Mujur Community Health Centre. Furthermore, the initial interviews did not establish each mother's level of knowledge or its association with her complementary feeding practices. The question requiring investigation is therefore whether maternal knowledge of complementary feeding is associated with feeding practices within this population. Research is needed to generate locally relevant evidence that can inform educational activities tailored to mothers' needs.

Accordingly, this study aims to examine the association between maternal knowledge of complementary feeding and complementary feeding practices among infants aged 6–12 months at Mujur Community Health Centre, East Praya, Central Lombok, in 2025. The findings are expected to inform the content of counselling and feeding support provided by healthcare professionals, particularly regarding the timing of complementary food introduction, appropriate food texture, meal frequency, and food safety. Such evidence may help direct educational activities towards the aspects of maternal knowledge and feeding practice that require the greatest attention

RESEARCH METHODS

Study Design and Setting

This study employed an analytical cross-sectional design to examine the association between maternal knowledge of complementary feeding and complementary feeding practices among mothers of infants aged 6–12 months. The study was conducted at Mujur Community Health Centre, East Praya District, Central Lombok Regency, Indonesia, in 2025. Data on maternal knowledge and feeding practices were collected on a single occasion through a

structured questionnaire, without subsequent follow-up.

Study Population and Participant Selection

The study population comprised 500 mothers of infants aged 6–12 months who were registered at Mujur Community Health Centre during the 2025 study period. A total of 87 mothers participated in the study. Participants were selected using purposive sampling. The inclusion criteria were mothers who had an infant aged 6–12 months, lived within the service area of Mujur Community Health Centre, were able to communicate in Indonesian, and were willing to participate in the study. Mothers were excluded if they were unable to complete the questionnaire or submitted questionnaires with substantially incomplete responses.

Eligible mothers were identified from the maternal and child health records at Mujur Community Health Centre and were approached during visits to the health centre and community health service activities within its service area. The sample size of 87 mothers was determined based on the number of eligible mothers who were available and willing to participate during the data-collection period. The population size alone was not used to establish the adequacy of the sample. As purposive sampling does not provide known selection probabilities, the sample cannot be assumed to be statistically representative of all 500 mothers. The findings therefore require cautious interpretation beyond the participating mothers.

Study Variables and Data Collection

The explanatory variable was maternal knowledge of complementary feeding, and the outcome variable was self-reported complementary feeding practice. Both variables were assessed using a structured questionnaire administered to mothers of infants aged 6–12 months.

The knowledge component assessed mothers' understanding of the definition, purpose, timing, types, texture, frequency, portion size, preparation, hygiene, and nutritional adequacy of complementary foods. The feeding practice component assessed the timing of complementary food introduction, the types and texture of foods provided, feeding frequency, portion size, dietary variety, food preparation, hygiene practices, and responsive feeding behaviours during the period preceding the survey.

The questionnaire was developed by the researcher based on complementary feeding recommendations issued by the World Health Organization and the Indonesian Ministry of Health. It contained 20 knowledge items and 15 feeding practice items. The questionnaire was administered through face-to-face interviews conducted by trained data collectors to reduce misunderstanding and ensure that all questions were answered consistently.

Before data collection, the questionnaire was reviewed by a maternal and child health expert and a public health research supervisor to assess content relevance and clarity. A pilot test was conducted among mothers of infants aged 6–12 months who were not included in the study sample. The questionnaire was revised based on the results of the review and pilot test.

Measurement and Scoring

The knowledge component consisted of factual questions with “correct,”

“incorrect,” and “do not know” response options. Each correct answer was assigned a score of 1, whereas incorrect and “do not know” answers were assigned a score of 0. The total knowledge score ranged from 0 to 20.

The feeding practice component consisted of questions regarding the frequency and implementation of complementary feeding behaviours. Responses were recorded using appropriate categorical options, including the age at which complementary foods were first introduced, the frequency of feeding, food texture, dietary variety, and hygiene practices. The practice items were scored according to the recommended complementary feeding behaviours. A score of 1 was assigned to each practice that met the recommended criterion, and a score of 0 was assigned to each practice that did not meet the criterion. The total practice score ranged from 0 to 15.

Knowledge and practice scores were calculated separately. Knowledge scores were categorised as good when the score was at least 76% of the maximum score, moderate when the score was 56–75%, and poor when the score was 55% or lower. Feeding practice scores were categorised as good when the score was at least 76% of the maximum score, moderate when the score was 56–75%, and poor when the score was 55% or lower. These thresholds were based on the percentage-based categorisation commonly used in health research.

The knowledge score was interpreted as an assessment of factual understanding rather than perceived knowledge or agreement with a statement. The timing of complementary food introduction was analysed separately from current feeding practices because the two measures referred to different periods.

Statistical Analysis

Data were analysed using IBM SPSS Statistics version 26. Descriptive analysis summarised categorical variables using frequencies and percentages. Cross-tabulations were used to display the distribution of complementary feeding practice categories across maternal knowledge categories. The association between maternal knowledge and complementary feeding practice was examined using Pearson’s chi-square test, with statistical significance set at $\alpha = 0.05$. Expected cell frequencies were examined before interpreting the chi-square result. When the assumptions for Pearson’s chi-square test were not met, Fisher’s exact test was used. Missing or incomplete responses were excluded from the analysis for the relevant variable, and the number of valid observations was reported in the results.

The bivariate analysis assessed an unadjusted association and did not account for potential confounding factors. Given the cross-sectional design, the findings were not interpreted as evidence that maternal knowledge caused differences in complementary feeding practices. In particular, knowledge measured at the time of the survey could not establish the knowledge mothers possessed when complementary foods were first introduced.

RESULTS AND DISCUSSION

Association between Maternal Knowledge of Complementary Feeding

and Reported Complementary Feeding Status

Uji	Statistik	Nilai p
Pearson's chi-square	$\chi^2(1) = 12.698$	0.000366, dilaporkan p < 0.001
Chi-square dengan koreksi kontinuitas Yates	$\chi^2(1) = 10.286$	0.001341
Fisher's exact, dua sisi	—	0.000965

Bivariate analysis examined the association between maternal knowledge of complementary feeding and reported complementary feeding status among mothers of infants aged 6–12 months at Mujur Community Health Centre, East Praya, Central Lombok, in 2025. The frequencies presented in Table 4.2 account for 32 respondents. Of the 18 mothers classified as having good knowledge, four (22.2%) were recorded as providing complementary foods, whilst 14 (77.8%) were recorded as not providing them. Among the 14 mothers classified as having less good knowledge, 12 (85.7%) were recorded as providing complementary foods and two (14.3%) as not providing them. These percentages were calculated within each knowledge category.

Recalculation using the displayed frequencies yielded a Pearson's chi-square statistic of 12.698 with one degree of freedom ($p < 0.001$). All expected cell frequencies exceeded five. These calculations indicate an association between the categories displayed in the table, subject to verification of the underlying data and coding. The direction of this association requires careful interpretation. Under the current labels, mothers with good knowledge were less frequently recorded as providing complementary foods than mothers with less good knowledge. This pattern does not support a conclusion that greater knowledge was associated with more appropriate feeding practices unless the meaning of the outcome categories is clarified. In particular, the provision of complementary foods at the time of the survey is conceptually different from their introduction before six months of age.

The table also differs from the methods section in both the number of observations and the classification of the study variables. The methods describe 87 participants and three categories for both knowledge and feeding practice, whereas the table contains 32 observations and two categories for each variable. These discrepancies must be resolved before the findings can be interpreted as the final study results.

Even after verification, the cross-sectional analysis would demonstrate an association rather than a causal relationship. Maternal knowledge measured at the time of the survey may not reflect the knowledge mothers possessed when they first introduced complementary foods. Furthermore, the bivariate analysis does not account for potential confounding factors. Any implications for maternal education should therefore be considered in relation to the verified outcome definition and the limitations of the study design.

CONCLUSION

Analysis of the 32 observations presented in the available cross-tabulation indicated a statistically significant association between maternal knowledge and reported complementary feeding status among mothers of infants aged 6–12 months at Mujur Community Health Centre in 2025 (Pearson's $\chi^2 = 12.698$, $df = 1$, $p < 0.001$). However, the findings do not establish that greater maternal knowledge was associated with more appropriate feeding practices, as the outcome categories require clarification. The cross-sectional design also precludes causal interpretation. Before a definitive conclusion can be drawn, the number of observations and variable classifications must be reconciled with those reported in the methods.

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